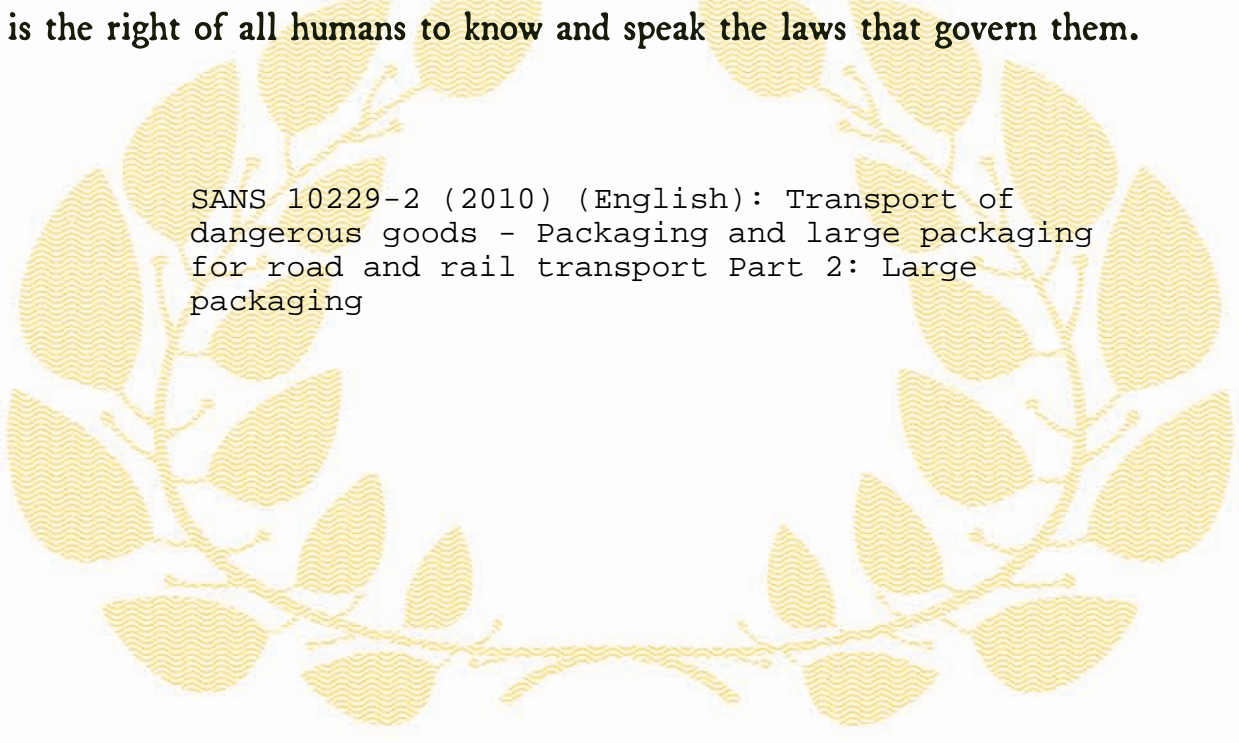




Republic of South Africa

EDICT OF GOVERNMENT

In order to promote public education and public safety, equal justice for all, a better informed citizenry, the rule of law, world trade and world peace, this legal document is hereby made available on a noncommercial basis, as it is the right of all humans to know and speak the laws that govern them.



SANS 10229-2 (2010) (English): Transport of dangerous goods - Packaging and large packaging for road and rail transport Part 2: Large packaging



BLANK PAGE



ISBN 978-0-626-24621-1

SANS 10229-2:2010

Edition 1.1

SOUTH AFRICAN NATIONAL STANDARD

**Transport of dangerous goods — Packaging
and large packaging for road and rail
transport**

Part 2: Large packaging

SANS 10229-2:2010

Edition 1.1

Table of changes

Change No.	Date	Scope
Amdt 1	2010	Amended to correct the title of the national accreditation authority and the title of an Act and to update the marking requirements.

Acknowledgement

The SABS Standards Division wishes to acknowledge the valuable assistance derived from the publications of the United Nations' Transport Division, Geneva, Switzerland.

Foreword

This South African standard was approved by National Committee SABS SC 1060C, *National committee for standards for dangerous goods including hazardous chemical substances and dangerous goods waste – Packaging*, in accordance with procedures of the SABS Standards Division, in compliance with annex 3 of the WTO/TBT agreement.

This document was published in August 2010.

This document supersedes SANS 10229-2:2007 (edition 1).

A vertical line in the margin shows where the text has been technically modified by amendment No. 1.

Reference is made in 3.1.1, 3.1.24 and 4.1 to the “national accreditation authority”. In South Africa this means the South African National Accreditation System (SANAS). **Amdt 1**

Reference is made in 3.1.5 to the competent authorities designated for the control or regulation of a certain aspect of the transport of dangerous goods. In South Africa the competent authorities responsible for the transport, including the packaging, of dangerous goods are as follows:

- Chief Inspector of Explosives of the South African Police Service in terms of the Explosives Act, 1956 (Act No. 26 of 1956) (as amended);
- Department of Agriculture in terms of the Fertilizer, Farm Feeds, Agricultural Remedies and Stock Remedies Act, 1947 (Act No. 36 of 1947) (as amended);
- Department of Health in terms of the Hazardous Substances Act, 1973 (Act No.15 of 1973) (as amended);
- Department of Transport in terms of the National Road Traffic Act Regulations 2000 of the National Road Traffic Act, 1996 (Act No. 93 of 1996);
- National Nuclear Regulator in terms of the National Nuclear Regulator Act, 1999 (Act No. 47 of 1999);
- Nuclear Energy Corporation of South Africa in terms of the Nuclear Energy Act, 1999 (Act No. 46 of 1999);

- g) Railway Safety Regulator in terms of the National Railway Safety Regulator Act, 2002 (Act No. 16 of 2002);
 - h) South African Civil Aviation Authority in terms of the South African Civil Aviation Authority Act, 1998 (Act No. 40 of 1998); and
 - i) South African Maritime Safety Authority in terms of the South African Maritime Safety Authority Act, 1998 (Act No. 5 of 1998).
- Amdt 1**

In 4.2 mention is made of “statutory regulations”. In South Africa this is the National Road Traffic Act, 1996 (Act No. 93 of 1996) of the Department of Transport.

SANS 10229 consists of the following parts, under the general title *Transport of dangerous goods – Packaging and large packing for road and rail transport*:

Part 1: Packaging.

Part 2: Large packaging.

Introduction

Imported dangerous goods that arrive **by air** and that are packed in accordance with the ICAO *Technical instructions for the safe transport of dangerous goods by air* or the IATA *Dangerous goods regulations*, or that arrive **by sea** and are packed in accordance with the *IMDG code* of the IMO, are acceptable for inland transport by road or rail. Likewise, dangerous goods that are packed in accordance with the requirements of this standard should, in most instances, be acceptable for export by air and by sea. However, exporters are reminded that limitations with regard to mass or specific goods might differ in the case of other modes of transport and the requirements of the relevant standard then have to be observed.

Owing to the fact that information in respect of names and addresses of competent authorities and certification authorities dealing with dangerous goods is subject to change, details of the competent authorities and certification authorities dealing with dangerous goods are given in a general advice sheet provided with this standard. This advice sheet will be updated every six months and it is the responsibility of the competent/certification authority to notify the SABS Standards Division South Africa of any changes. The advice sheet will be available, free of charge, from the Standards Sales Department of the SABS Standards Division

B.2 and annex C of SANS 10228 are referenced in legislation. The contents of these annexes are regularly updated to keep up with the latest technology without the necessity to change legislation as well. For this reason the publication date of SANS 10228 is not given where B.2 and annex C are referred to in this standard.

Contents

	Page
Acknowledgement	
Foreword	
Introduction	
1 Scope	5
2 Normative references	5
3 Definitions and abbreviations	6
3.1 Definitions	6
3.2 Abbreviations	8
4 Test stations and certification authorities	8
4.1 Test stations	8
4.2 Certification authorities	8
5 Dangerous goods listings for large packaging and transport	9
5.1 General	9
5.2 Annex B of SANS 10228	9
5.3 Annex C of SANS 10228	9
6 Classification system, packing group allocation and subsidiary risk	9
6.1 General	9
6.2 Classification system	9
6.3 Packing group allocation	10
6.4 Subsidiary risk	11
7 Design type evaluation and approval	11
7.1 General	11
7.2 Validity period of a certificate	11
7.2.1 General	11
7.2.2 Initial inspection and testing	12
7.2.3 Periodic inspection and testing	12
8 Codes for the types of large packaging	13
8.1 General	13
8.2 Codes for the construction of large packaging	13

Contents *(concluded)*

	Page
9 Marking for compliance	14
9.1 General.....	14
9.2 Marking requirements	14
10 Requirements for all types of large packaging	15
10.1 General.....	15
10.2 Requirements concerning packing instructions	16
10.3 List of packing instructions	17
10.4 Special packaging requirements for explosives of class 1	19
11 Specific requirements for large packaging	19
11.1 Metal.....	19
11.2 Flexible	20
11.3 Rigid plastics	20
11.4 Fibreboard	21
11.5 Wood	22
12 Test requirements	23
12.1 Design type testing.....	23
12.2 Preparation for testing.....	24
12.3 Performance testing	25
12.3.1 Bottom lift test	25
12.3.2 Top lift test.....	26
12.3.3 Stacking test.....	27
12.3.4 Drop test.....	28
12.3.5 Test report.....	29
13 Marking and labelling for transport	29
13.1 Hazard labels	29
13.2 Transport information	30
13.3 Location of marking and labels	30
13.4 Durability of marking and labels.....	30
13.5 Additional marking.....	31
13.5.1 General	31
13.5.2 Environmental hazards	31
13.5.3 Marine pollutants.....	31
Bibliography	36

SANS 10229-2:2010

Edition 1.1

This page is intentionally left blank

Transport of dangerous goods — Packaging and large packaging for road and rail transport

Part 2: Large packaging

1 Scope

This standard identifies the various types of large packaging that are suitable for the transport of dangerous goods by road and rail. It describes minimum performance requirements for the large packaging, the procedures to be followed to obtain approval from test stations or certification authorities and gives details of the marking and labelling to be displayed on the large packaging.

NOTE The requirements of this standard do not apply to:

- a) gases of class 2, except aerosol dispensers and gas cylinders;
- b) infectious substances of division 6.2, except clinical waste of UN 3291 (see SANS 10228); and
- c) class 7 packages containing radioactive material.

2 Normative references

The following referenced documents are indispensable for the application of this document. All normative documents are subject to revision and, since any reference to a normative document is deemed to be a reference to the latest edition of that document, parties to agreements based on this document are encouraged to take steps to ensure the use of the most recent editions of the normative documents indicated below. Information on currently valid national and international standards can be obtained from the SABS Standards Division.

ISO 535, *Paper and board – Determination of water absorptiveness – Cobb method*.

ISO 3036, *Board – Determination of puncture resistance*.

[SANS 10228, *The identification and classification of dangerous goods for transport*](#).

[SANS 10229-1, *Transport of dangerous goods – Packaging and large packaging for road and rail transport – Part 1: Packaging*](#).

3 Definitions and abbreviations

For the purposes of this document, the following definitions and abbreviations apply.

3.1 Definitions

3.1.1

accredited test station

laboratory accredited by the national accreditation authority (see foreword)

3.1.2

ambient temperature

temperature of $23\text{ °C} \pm 2\text{ °C}$

3.1.3

bag

flexible packaging made of paper, plastics film, textiles, woven material or other similar material

3.1.4

closure

device that closes an opening in a receptacle

3.1.5

competent authority

national body or authority designated or otherwise recognized for the control or regulation of a particular aspect of the transport of dangerous goods

NOTE 1 The competent authorities are listed in the foreword.

NOTE 2 See the *Advice sheet: dangerous goods* provided with the standard for contact information.

3.1.6

dangerous goods

goods that are capable of posing a significant risk to health and safety or to property and the environment and that are listed in SANS 10228

3.1.7

design type large packaging

large packaging (samples of which are presented for testing) as defined by its design, size, material(s), thickness, mass and surface treatment(s), and the method(s) by which it is produced

3.1.8

handling device

top lift device or fork lift pockets provided in large packaging, or any sling, loop eye or frame attached to the body of the large packaging, or formed from a continuation of the large packaging body material

3.1.9

inner packaging

container that requires outer packaging for transport purposes

NOTE See SANS 10229-1 for the requirements of inner packaging.

3.1.10

large packaging

packaging consisting of an outer packaging that contains articles or inner packaging and that

a) is designed for mechanical handling; and

b) exceeds 400 kg net mass or 450 L capacity but has a volume of not more than 3 m³

3.1.11

liquid

substance that has a vapour pressure of not more than 300 kPa at 50 °C, is not completely gaseous at 20 °C at a pressure of 101,3 kPa and that has a melting point or initial melting point of 20 °C or less at a pressure of 101,3 kPa

3.1.12

marine pollutant

substance that meets the definition of a marine pollutant in accordance with Protocol 1 to the International Maritime Organization Pollution Convention (MARPOL 73/78) and indicated with "P" and "PP" in SANS 10228 and, when in a solution or mixture of one or more marine pollutants, in a concentration which equals or exceeds:

10 % (by mass) of the solution or mixture for substances marked "P"; or

1 % (by mass) of the solution or mixture for substances marked with "PP" (severe marine pollutants)

3.1.13

maximum capacity

maximum inner volume of packaging, expressed in litres

3.1.14

maximum net mass

maximum net mass of contents in a single packaging or maximum combined mass of inner packaging and the contents thereof, expressed in kilograms

3.1.15

maximum permissible gross mass

mass of a large packaging and its service equipment and structural equipment plus the maximum permissible load

3.1.16

maximum permissible load

maximum net mass for which a flexible large packaging is intended to be used and that it is authorized to carry

3.1.17

packing instruction

alphanumeric code that indicates the packaging that can be used for the transport of a substance

3.1.18

plastics

when used in connection with inner packaging of a large packaging, the term "plastics" is taken to include other polymeric materials such as rubber

SANS 10229-2:2010

Edition 1.1

3.1.19

proper shipping name

part of an entry that most accurately describes the dangerous goods listed in SANS 10228 and that is printed in capital letters

3.1.20

service equipment

filling, discharge, pressure relief, safety, venting, heating and heat insulating devices and measuring instruments fitted to a large packaging

3.1.21

special packing provision

numerical code preceded by the letter "L", which indicates a special provision applicable to the use of a packing instruction (see 3.1.17)

3.1.22

structural equipment

reinforcing, fastening, handling, protective or stabilizing members of the body of a large packaging, including the base pallet

3.1.23

superimposed test load

load to be placed on a large packaging during the stacking test

3.1.24

test station

test station accredited by the national accreditation authority (see foreword) for the testing of large packaging for all classes of dangerous goods as indicated in SANS 10228

3.1.25

United Nations (UN) number

serial number assigned to dangerous goods by the United Nations Committee of Experts on the Transport of Dangerous Goods

3.2 Abbreviations

3.2.1 LP — large packaging

3.2.2 UN — United Nations

4 Test stations and certification authorities

4.1 Test stations

For the purposes of this standard, the authorities responsible for the testing of large packaging that can be offered for the transport of specific classes and divisions of dangerous goods are accredited test stations approved by the competent authorities. Information regarding these facilities can be obtained from the relevant competent authority (see the advice sheet) and the national accreditation authority (see foreword).

4.2 Certification authorities

For the purposes of this standard, the authorities responsible for the certification of large packaging of specific classes and divisions of dangerous goods that can be offered for transport are approved by statutory regulations (see foreword).

5 Dangerous goods listings for large packaging and transport

5.1 General

SANS 10228 establishes the official identification and classification of dangerous goods for transport. For the purposes of this standard, the lists in B.2 and annex C of SANS 10228 shall be consulted.

5.2 Annex B of SANS 10228

5.2.1 B.1 gives the relevant special provisions relating to individual articles or substances.

5.2.2 B.2 consists of a numerical list of dangerous goods and gives, in tabulated form, the information required for the identification, i.e. the UN number, the technical name and description, the class, the packing group, the subsidiary risk, limited quantity requirements, special provision, and reference to appropriate packing instructions.

5.3 Annex C of SANS 10228

This annex consists of an alphabetical list of dangerous goods and gives, in tabulated form, the proper shipping name, the class or division and the UN number.

6 Classification system, packing group allocation and subsidiary risk

6.1 General

All aspects of the identification and classification of dangerous goods intended for transport are dealt with in detail in SANS 10228. For easy reference, this standard also contains a compilation of the classification system, packing group allocation and subsidiary risk.

6.2 Classification system

6.2.1 Class 1: explosives

This class is subdivided into six divisions, 1.1 to 1.6.

6.2.2 Class 2: gases

This class is subdivided as follows:

- a) **division 2.1:** flammable gases;
- b) **division 2.2:** non-flammable, non-toxic gases; and
- c) **division 2.3:** toxic gases.

6.2.3 Class 3: flammable liquids

This class has no subdivisions and comprises liquids capable of being ignited.

6.2.4 Class 4: flammable solids; substances liable to spontaneous combustion; substances that, on contact with water, emit flammable gases

This class is subdivided as follows:

- a) **division 4.1:** flammable solids, self-reactive substances and solid desensitized explosives;
- b) **division 4.2:** substances liable to spontaneous combustion; and
- c) **division 4.3:** substances that, on contact with water, emit flammable gases.

6.2.5 Class 5: oxidizing substances and organic peroxides

This class is subdivided as follows:

- a) **division 5.1:** oxidizing substances; and
- b) **division 5.2:** organic peroxides.

6.2.6 Class 6: toxic and infectious substances

The class is subdivided as follows:

- a) **division 6.1:** toxic substances; and
- b) **division 6.2:** infectious substances.

6.2.7 Class 7: radioactive material

The class has no subdivisions.

6.2.8 Class 8: corrosives

This class has no subdivisions and comprises substances that, by chemical action, cause damage to living tissue, to commonly used metals, or to other cargo.

6.2.9 Class 9: miscellaneous dangerous substances and articles

This class comprises any substance not covered by other classes, but that has been or could be shown, by experience, to be of such a dangerous character that the provisions of this class should apply to it.

6.3 Packing group allocation

6.3.1 General

For packing purposes, certain substances listed in SANS 10228 are assigned to three packing groups in accordance with their degree of danger.

NOTE Dangerous goods of classes 1, 2 and 7, divisions 5.2 and 6.2 and self-reactive substances of division 4.1, are excluded from the packing group allocation.

6.3.2 Packing groups

The packing groups have the following meaning:

- a) **packing group I**: high-strength large packaging for substances that present a high danger;
- b) **packing group II**: medium-strength large packaging for substances that present a medium danger; and
- c) **packing group III**: low-strength large packaging for substances that present a low danger.

6.4 Subsidiary risk

Where applicable, a subsidiary danger risk of a substance is also identified in terms of the classification system (see SANS 10228 for details).

7 Design type evaluation and approval

7.1 General

7.1.1 Sufficient large packaging per design type (one specimen for each test), shall be examined by a test station (see 3.1.24) for compliance with all the relevant requirements of this standard. A certification authority shall issue a certificate of compliance on satisfactory completion of the design type test (see 12.1). The user, or manufacturer of a large packaging can then proceed to order or manufacture large packaging that complies in all respects with the design specifications. Each large packaging so ordered or manufactured, shall be marked with the compliance markings indicated on the certificate (see clause 9).

7.1.2 Large packaging intended for the transport of dangerous goods shall be manufactured and tested under a quality system that satisfies the relevant competent authority in order to ensure that each large packaging complies with the requirements of this standard.

NOTE SANS 9001 is the quality assurance model that can be applied by a manufacturer for the assessment of the manufacturing procedure by external parties.

7.1.3 The packing instructions (see 10.3) have been used successfully for the transport of dangerous goods. However, there is no objection to the use of large packaging manufactured to requirements that differ from those in clause 10, provided that the large packaging is equally effective, acceptable to the competent authority, and can successfully withstand the performance tests described in 12.3.

7.1.4 The competent authority may at any time require proof, through testing by a test station, that the large packaging can pass the performance tests given in this standard.

7.2 Validity period of a certificate

7.2.1 General

7.2.1.1 The validity period of a certificate shall be as prescribed by 7.2.3.2 and 7.2.3.3. If the design, material, or manner of construction recorded in the manufacturer's specification is altered in any way, the large packaging shall be re-examined and after successful inspection and testing, a new certificate of compliance shall be issued (see 7.1.1).

7.2.1.2 Following the design type approval, large packaging put into service shall be maintained in a serviceable condition by regular inspections and tests (see 7.2.3).

7.2.1.3 The owner shall keep records of inspections, tests and repairs for as long as the large packaging remains in service.

7.2.2 Initial inspection and testing

Before a new large packaging is put into service, the owner of the large packaging shall arrange that the large packaging undergoes initial inspection in accordance with 12.1, and that record is kept of the relevant dates and the results obtained.

7.2.3 Periodic inspection and testing

7.2.3.1 General

The owner of a large packaging shall ensure that the inspections and tests given in 7.2.3.2 and 7.2.3.3, as applicable, are carried out on the large packaging.

7.2.3.2 Metal and rigid plastics large packaging

7.2.3.2.1 Metal and rigid plastics large packaging shall be subjected to the following periodic inspection and testing:

- a) **at intervals not exceeding 30 months:** visual examination of the internal and external areas of the large packaging and the proper functioning of its service equipment; and
- b) **at intervals not exceeding 60 months:** assessment of compliance of the large packaging with the design type specification (including marking), internal and external condition and the proper functioning of its service equipment.

7.2.3.3 Flexible, fibreboard and wooden large packaging

7.2.3.3.1 Periodic inspection tests at ambient conditions on fibreboard large packaging are considered equivalent to the requirements of 12.2.5.

7.2.3.3.2 A flexible, fibreboard, and a wooden large packaging shall be subjected to visual examination of the internal and external areas of the large packaging and assessment of compliance with the design type specification (including marking) at intervals not exceeding 12 months.

7.2.3.4 Transport of large packaging after the expiry date of the last periodic inspection or testing

7.2.3.4.1 Large packaging shall not be filled and offered for transport after the expiry date of the last periodic inspection or testing.

7.2.3.4.2 Large packaging filled before the expiry date of the last periodic inspection or testing may be transported for a period not exceeding three months beyond the expiry date of the last periodic inspection and testing.

7.2.3.4.3 In addition, large packaging may be transported after the expiry date of the last periodic inspection and testing as follows:

- a) after emptying but before cleaning, for purposes of performing the required test or inspection before refilling, and
- b) for a period not exceeding six months beyond the expiry date of the last periodic inspection or testing in order to allow the return of dangerous goods for proper disposal or recycling.

8 Codes for the types of large packaging

8.1 General

8.1.1 The code used for large packaging consists of

- a) two Arabic numerals,
 - 1) 50 for rigid large packaging, or
 - 2) 51 for flexible large packaging, and
- b) a capital letter indicating the nature of the material, for example, wood and steel (see 8.2).

8.1.2 The letter “W” may follow the large packaging code. The letter “W” signifies that the large packaging, although of the same type as that indicated by the code, has been manufactured to requirements different from those in clause 11, but is considered to meet the requirements of 7.1.

8.2 Codes for the construction of large packaging

The material of which a large packaging is manufactured is indicated as follows:

- A – steel (all types and surface treatments)
- B – aluminium;
- C – natural wood;
- D – plywood;
- F – reconstituted wood;
- G – fibreboard;
- H – plastics material;
- M – paper, multiwall;
- N – metal (other than steel or aluminium).

9 Marking for compliance

9.1 General

9.1.1 The design type large packaging may be marked in accordance with this clause only after it has passed the required performance tests carried out by the designated competent testing authority.

9.1.2 The marking is intended to be of assistance to manufacturers, reconditioners, reproducers, users and transporters of large packaging, and also to competent authorities, in that it indicates the large packaging type and that the performance test requirements have been met.

9.1.3 The certification authority issues a certificate of compliance that shall be valid for a period of time as specified in 7.2.3. During this time, the manufacturer shall not in any way alter the design, material or manner of construction recorded on the manufacturer design drawings and specifications.

9.1.4 On satisfactory completion of the design type testing (see 12.1) and after the issuing of a certificate of compliance (see 7.1.1), each large packaging shall bear marking that is durable and legible. The marking shall be placed on two opposite sides in a location so as to be readily visible, even when the large packaging is stacked. Letters, numerals and symbols shall be of height at least 12 mm.

9.2 Marking requirements

9.2.1 Each large packaging approved in terms of this standard shall bear the following markings:

a) The United Nations packaging symbol



This symbol shall not be used for any purpose other than certifying that a packaging complies with the relevant requirements of SANS 10229-1 **Amdt 1**

For metal large packaging on which the marking is stamped or embossed, the capital letters “UN” can be put in place of the symbol;

b) the code “50” designating a large rigid packaging or “51” for flexible large packaging, followed by the material type in accordance with 8.2;

c) a capital letter designating the packing group(s) for which the design type has been approved:

- X for packing groups I, II and III
- Y for packing groups II and III
- Z for packing group III only;

d) the date of manufacture, indicated by the last two digits of the month and year, for example “11/06”;




e) the state authorizing the allocation of the mark; indicated by the distinguishing sign for motor vehicles in international traffic;

f) the name or symbol of the manufacturer or any other identification of the large packaging as specified by the competent authority;

- g) the reference number of the certificate of compliance issued by the certification authority;
- h) the stacking test load in kilograms. A large packaging not designed for stacking shall show the figure "0"; and
- i) the maximum permissible gross mass in kilograms.

9.2.2 The primary markings given in 9.2.1(a) to (i) shall be applied in the sequence given. Each element of the marking shall be clearly separated, for example, by a slash or a space, so as to be easily identifiable. Examples of primary markings are given in table 1.

Table 1 — Examples of primary markings

	50A/X/05/01/ZA/PQR CT510 2500/1000	Large steel packaging/ Packing group I, II and III/ Manufactured May 2001/Approved South Africa/ Manufactured by PQR. Approval certificate number CT510. Suitable for stacking test load 2500 kg/ Maximum gross mass 1000 kg.
	50H/Y/04/02/AUS/ABC CT805 0/800	Large rigid plastics packaging/ packing group II and III/ Manufactured April 2002/ Approved Australia/ Manufactured by ABC. Approval certificate CT805. Not designed to be stacked/ Maximum gross mass 800 kg.
	51M/Z/11/03/ZA/BCD CT356 0/500	Large multiwall paper packaging/ Packing group III/ Manufactured November 2003/ Approved South Africa/ Manufactured by BCD. Approval certificate CT356. Not designed to be stacked/ Maximum gross mass 500 kg.

10 Requirements for all types of large packaging

10.1 General

10.1.1 Dangerous goods shall be packed in good quality large packaging that is strong enough to withstand the shocks and loadings normally encountered during transport, including trans-shipment between transport units and warehouses as well as any removal from a pallet for subsequent mechanical handling.

10.1.2 Large packaging shall be constructed and closed so as to prevent any loss of contents by vibration, changes in temperature, humidity or pressure, under normal conditions of transport.

10.1.3 Manufacturers and subsequent distributors of large packaging shall provide information regarding procedures to be followed, the types and dimensions of closures (including the required gaskets) and any other components needed to ensure that large packaging, as presented for transport, is capable of passing the applicable performance tests given in 12.3.

10.1.4 No dangerous goods shall adhere to the outside of a large packaging during transport.

10.1.5 Parts of a large packaging that are in direct contact with dangerous goods shall not

- a) be affected or significantly weakened by those dangerous goods, and
- b) cause a dangerous effect, for example, catalysing a reaction or reacting with the dangerous goods.

Where necessary, the large packaging shall be provided with a suitable inner coating or treatment.

SANS 10229-2:2010

Edition 1.1

10.1.6 New, remanufactured and reused large packaging shall be capable of passing the relevant performance tests given in 12.3.

10.1.7 When filling a large packaging with packaging containing liquids, sufficient ullage shall be left to ensure that neither leakage nor permanent distortion of the packaging occurs as a result of an expansion of the liquid caused by temperatures likely to occur during transport.

10.1.8 Where a large packaging has been successfully tested with different types of inner packaging (see SANS 10229-1), a variety of such inner packaging may be assembled in the large packaging.

10.1.9 Dangerous goods shall not be packed in the same large packaging with another type of dangerous or non-dangerous goods if they react dangerously with one another and give rise to any (or a combination) of the following:

- a) the combustion or evolution (or both) of considerable heat;
- b) the evolution of flammable, toxic or asphyxiant gases;
- c) the formation of corrosive substances; or
- d) the formation of unstable substances.

10.1.10 Before being filled, a large packaging shall be inspected to ensure that it is free from corrosion, contamination or other damage. Any large packaging that shows signs of reduced strength as compared with the approved design type shall no longer be used or shall be so repaired that it is able to withstand the design type tests.

10.1.11 An empty uncleaned large packaging that previously contained dangerous goods shall still comply with all the requirements applicable to a filled large packaging until such time that it has been purged of the residue of the dangerous goods.

10.1.12 Large packaging intended for the transport of explosives of class 1, self-reactive substances of division 4.1 and organic peroxides of division 5.2 shall comply with the provisions of packing group II (see 12.3.4).

10.1.13 Large packaging and the inner packagings contained therein shall be closed as for transport and in accordance with any special instructions.

10.2 Requirements concerning packing instructions

10.2.1 Packing instructions applicable to specific dangerous goods intended for transport in large packaging are given in B.2 of SANS 10228 and are designated by an alphanumeric code "LP".

10.2.2 A packing instruction could specify a special packing provision for an individual substance or article. Such a special provision is designated by the alphanumeric code "L".

10.2.3 Generally, packing instructions do not provide guidance on compatibility and the user shall not select a large packaging without first checking that the substance intended for transport is compatible with the material of the large packaging.

10.2.4 Large packaging of flexible plastics (51H) shall not be used when the substances to be transported are liable to become liquid during transport.

10.3 List of packing instructions

LP01		PACKING INSTRUCTION (LIQUIDS)			LP01
The following large packagings are authorized provided that the requirements of 10.1 and 10.2 are met.					
Inner packaging		Large outer packaging	Packing group I	Packing group II	Packing group III
Glass	10 L	Steel (50A)	Not allowed	Not allowed	Maximum capacity: 3 m ³
Plastics	30 L	Aluminium (50B)			
Metal	40 L	Metal other than steel or aluminium (50N)			
		Rigid plastics (50H)			
		Natural wood (50C)			
		Plywood (50D)			
		Reconstituted wood (50F)			
		Fibreboard (50G)			

LP02		PACKING INSTRUCTION (SOLIDS)			LP02
The following large packagings are authorized provided that the requirements of 10.1 and 10.2 are met:					
Inner packaging		Large outer packaging	Packing group I	Packing group II	Packing group III
Glass	10 kg	Steel (50A)	Not allowed	Not allowed	Maximum capacity: 3 m ³
Plastics ^b	50 kg	Aluminium (50B)			
Metal	50 kg	Metal other than steel or			
Paper ^{a, b}	50 kg	Aluminium (50N)			
Fibreboard ^{a, b}	50 kg	Flexible plastics (51H) ^c			
		Rigid plastics (50H)			
		Natural wood (50C)			
		Plywood (50D)			
		Reconstituted wood (50F)			
		Fibreboard (50G)			
^a This inner packaging shall not be used if the substance(s) intended for transport can become liquid during transport.					
^b This inner packaging shall be sift-proof.					
^c This large outer packaging shall be used with flexible inner packaging only.					
Special packing provision:					
L2 For UN 1950 aerosols, the large packaging shall meet packing group III performance level. In addition, large packaging for waste aerosols transported in accordance with special provision 327 (see B.1 of SANS 10228) shall have a means of retaining any free liquid that might escape during transport, for example, absorbent material.					

10.3 List of packing instructions *(continued)*

LP99	PACKING INSTRUCTION	LP99
Only large packaging approved by the competent authority is permitted.		

LP101	PACKING INSTRUCTION	LP101
The following large packagings are authorized, provided that the requirements of 10.1 and 10.2 are met.		
Inner packaging	Intermediate packaging	Large packaging
Not necessary	Not necessary	Steel (50A) Aluminium (50B) Metal other than steel or aluminium (50N) Rigid plastics (50H) Natural wood (50C) Plywood (50D) Reconstituted wood (50F) Fibreboard (50G)
Special packing provision: L1 For UN Nos. 0006, 0009, 0010, 0015, 0016, 0018, 0019, 0034, 0035, 0038, 0039, 0048, 0056, 0137, 0138, 0168, 0169, 0171, 0181, 0182, 0183, 0186, 0221, 0243, 0244, 0245, 0246, 0254, 0280, 0281, 0286, 0287, 0297, 0299, 0300, 0301, 0303, 0321, 0328, 0329, 0344, 0345, 0346, 0347, 0362, 0363, 0370, 0412, 0424, 0425, 0434, 0435, 0436, 0437, 0438, 0451, 0488 and 0502 (see B.2 of SANS 10228): Large and robust explosive articles, normally intended for military use, without their means of initiation or with their means of initiation containing at least two effective protective features, may be carried unpackaged. When such articles have propelling charges or are self-propelled, their ignition systems shall be protected against stimuli encountered during normal conditions of transport. A negative result in Test Series 4 of the United Nations' <i>Manual of tests and criteria</i> on an unpackaged article indicates that the article can be considered for transport unpackaged. Such unpackaged articles shall be fixed to cradles or contained in crates or other suitable handling devices.		

LP102	PACKING INSTRUCTION	LP102
The following large packagings are authorized, provided that the requirements of 10.1 and 10.2 are met.		
Inner packaging	Intermediate packaging	Large outer packaging
Bags Water resistant Receptacles fibreboard metal plastics wood Sheets fibreboard, corrugated Tubes fibreboard	Not necessary	Steel (50A) Aluminium (50B) Metal other than steel or aluminium (50N) Rigid plastics (50H) Natural wood (50C) Plywood (50D) Reconstituted wood (50F) Rigid fibreboard (50G)

10.3 List of packing instructions *(continued)*

LP621	PACKING INSTRUCTION	LP621
This packing instruction applies to UN 3291 (see B.2 of SANS 10228).		
<p>The following large packagings are authorized, provided the requirements of 10.1 and 10.2 are met:</p> <p>a) <u>For clinical waste in inner packaging:</u> Rigid, leakproof large packaging conforming to the requirements for solids at packing group II performance level (see 12.3.4) and provided that</p> <ol style="list-style-type: none"> 1) there is sufficient absorbent material to absorb the entire amount of liquid present, and 2) the large packaging is capable of retaining liquids. <p>b) <u>For packages containing larger quantities of liquid:</u> Large rigid packaging conforming to the requirements for liquids at packing group II performance level.</p>		
<p>Additional requirement:</p> <p>Large packaging intended to contain sharp objects such as broken glass and needles shall be resistant to puncture and shall retain liquids under the performance test conditions given in 12.3.</p>		

LP902	PACKING INSTRUCTION	LP902
This instruction applies to UN 3268.		
<p>The following large packagings are authorized, provided that the requirements of 10.1 and 10.2 are met.</p> <p>The large packaging shall conform to packing group III performance level (see 12.3.4) and shall be so designed and constructed as to prevent movement of the articles and inadvertent operation during normal conditions of transport. The articles can also be transported unpackaged in dedicated handling devices, vehicles, containers or wagons when moved from where they are manufactured to an assembly plant.</p>		
<p>Additional requirement:</p> <p>A pressure vessel shall comply with the requirements of the competent authority for the substance(s) contained in the pressure vessel.</p>		

10.4 Special packing requirements for explosives of class 1

Large packaging intended for the transport of explosives of class 1 shall meet the test requirements given in 12.3.4 at packing group II performance level. Packaging, other than metal packaging, meeting the test criteria of packing group I may be used. To avoid unnecessary confinement, metal packaging of packing group 1 shall not be used (see also 12.3.4.3.3 and SANS 10229-1).

11 Specific requirements for large packaging

11.1 Metal

11.1.1 There are three types of metal large packaging:

- a) 50A steel;
- b) 50B aluminium; and
- c) 50N metal (other than steel or aluminium).

11.1.2 A metal large packaging shall be made of ductile metal and the welding properties have to be fully demonstrated. Welds shall be skilfully made and shall afford complete safety. Low-temperature performance shall be taken into account when appropriate.

11.1.3 Care shall be taken to avoid damage by galvanic action due to the juxtaposition of dissimilar metals.

11.2 Flexible

11.2.1 There are two types of flexible large packaging:

- a) 51H flexible plastics; and
- b) 51M paper.

11.2.2 The plastics material used in the construction of a flexible large packaging of type 51H shall be suitable for its intended application. The strength of the material and its construction shall be appropriate to its capacity and its intended use.

11.2.3 Paper used in the construction of a flexible large packaging of type 51M shall, after complete immersion in water for a period of 24 h, retain at least 85 % of the tensile strength as measured originally on the material conditioned in an atmosphere of (50 ± 2) % relative humidity and at a temperature of (23 ± 2) °C.

11.2.4 The seams of a flexible large packaging shall be formed either by stitching, heat sealing, gluing, or any other method that is equally effective. Stitched seam-ends shall be secured and, when relevant, seams shall be straight.

11.2.5 Flexible large packaging shall provide adequate resistance to ageing and to degradation caused by ultraviolet radiation, climatic conditions, or by the substance contained, thereby rendering the large packaging appropriate to its intended use.

11.2.6 No material recovered from used receptacles shall be used in the manufacture of a flexible large packaging. Production residues of scrap from the same manufacturing process may, however, be used. Component parts such as fittings and pallets may also be used, provided such components have not in any way been damaged in previous use.

11.2.7 Protection against ultraviolet radiation for flexible plastics large packaging shall be provided by the addition of carbon black or other suitable pigments or inhibitors. These additives shall be compatible with the intended contents of the large packaging and shall remain effective throughout the life of the large packaging. Where use is made of ultraviolet inhibitors other than those used in the tested design type, retesting of a flexible large packaging may be waived if the changes in the additives do not adversely affect the physical properties of the material of construction.

11.2.8 Additives, other than ultraviolet inhibitors may be incorporated into the material of the flexible large packaging to improve the resistance to ageing or to serve other purposes, provided that these additives do not adversely affect the physical or chemical properties of the material.

11.2.9 When filled, the ratio of height to width of a large packaging shall be not more than 2:1.

11.3 Rigid plastics

11.3.1 Rigid plastics large packaging is identified by the code "50H".

11.3.2 Rigid plastics large packaging shall be manufactured from suitable plastics material of known specifications and of adequate strength in relation to its capacity and its intended use. The material shall be adequately resistant to ageing and to degradation caused by the substance contained or, where relevant, by ultraviolet radiation. Low temperature performance shall be taken into account when appropriate. Any permeation of the substance contained in the large packaging shall not constitute a danger under normal conditions of transport.

11.3.3 No used material other than production residues or regrind from the same manufacturing process shall be used in the manufacturing of rigid plastics large packaging.

11.3.4 Protection against ultraviolet radiation for a large packaging shall be provided by the addition of carbon black or other suitable pigments or inhibitors. These additives shall be compatible with the intended contents and shall remain effective throughout the life of the large packaging. Where use is made of ultraviolet inhibitors other than those used in the tested design type, retesting may be waived if the changes in the additives do not adversely affect the physical properties of the material of construction.

11.3.5 Additives, other than ultraviolet inhibitors may be incorporated into the material of the rigid plastics large packaging to improve the resistance to ageing or to serve other purposes, provided that these additives do not adversely affect the physical or chemical properties of the material.

11.4 Fibreboard

11.4.1 Fibreboard large packaging is identified by the code "50G".

11.4.2 A fibreboard large packaging shall be constructed of strong and good quality solid board or double-faced corrugated fibreboard (single wall or multiwall) appropriate to the capacity of the large packaging and its intended use.

11.4.3 The fibreboard shall be water resistant. The water resistance of the outer surface of the fibreboard shall be such that the increase in mass, as determined by the Cobb method in accordance with ISO 535 and using an exposure time of 30 min, does not exceed 155 g/m².

11.4.4 The fibreboard shall have good bending qualities, and shall be so cut, creased without scoring and slotted so that it can be assembled without tearing, cracking or undue bending. The fluting or corrugated fibreboard shall be firmly glued to the liners with water-resistant glue.

11.4.5 Fibreboard used for any body part (walls, top, bottom) of the fibreboard large packaging shall, when tested in accordance ISO 3036, have a puncture resistance of at least 15 J.

11.4.6 Manufacturing joins of a fibreboard large packaging shall be made with an appropriate overlap and shall be taped, glued, stitched with metal staples, or fastened by other means that are equally effective. Where joins are glued or taped, a water-resistant adhesive shall be used. Metal staples shall pass completely through all pieces to be fastened and shall be so formed or protected that the inner liner of the large packaging cannot be abraded or punctured by them.

11.4.7 Any integral pallet base forming part of fibreboard large packaging, or any detachable pallet, shall be suitable for mechanical handling when the large packaging is filled to its maximum permissible gross mass.

11.4.8 The pallet or integral base of fibreboard large packaging shall be so designed as to avoid any protrusion of the base that might be liable to damage in handling.

11.4.9 A fibreboard large packaging shall be secured to any detachable pallet to ensure stability in handling and transport. The top surface of a detachable pallet shall be free from sharp protrusions that might damage the large packaging.

11.4.10 Timber supports used as strengthening devices to increase stacking performance can be used, provided that they are external to the liner of the fibreboard large packaging.

11.4.11 The bearing surface of fibreboard large packaging intended for stacking shall be such as to distribute the load in a safe manner.

11.4.12 A fibreboard large packaging shall not be fitted with top-lift devices.

11.5 Wood

11.5.1 There are three types of wooden large packaging:

- a) 50C natural wood;
- b) 50D plywood; and
- c) 50F reconstituted wood.

11.5.2 The materials used for the construction of wooden large packaging shall be of adequate strength in relation to its capacity and the intended use.

11.5.3 Natural wood used for large packaging shall be well-seasoned, commercially dry and free from defects that could lessen the strength of any part of the large packaging. Each part of the large packaging shall be constructed from a single piece of wood or the equivalent of it. Parts are considered equivalent to a single piece if one of the following methods of glued assembly was used:

- a) Lindermann joint, tongue and groove joint, ship-lap joint or rabbet joint; or
- b) butt joint with at least two corrugated metal fasteners at each joint; or
- c) any other method that is equally effective.

11.5.4 Plywood used for the construction of large packaging shall comply with the following requirements:

- a) it shall consist of at least three plies and all adjacent plies shall be glued with water-resistant adhesive; and
- b) the plywood shall be of well-seasoned rotary cut, sliced or sawn veneer, commercially dry and free from defects that could significantly lessen the strength of the large packaging.

NOTE Other suitable materials can be used in conjunction with plywood.

11.5.5 Reconstituted wood such as hardboard or particle board, used for the construction of large packaging shall be water resistant.

11.5.6 The panels of a wooden large packaging shall be firmly nailed or secured to corner posts or ends, or shall be assembled by means of other equally effective devices.

11.5.7 Any integral pallet base forming part of a wooden large packaging, or any detachable pallet, shall be suitable for mechanical handling when the large packaging is filled to its maximum permissible gross mass.

11.5.8 The pallet or integral base of wooden large packaging shall be so designed as to avoid any protrusion of the base that might be liable to damage the large packaging in handling.

11.5.9 A wooden large packaging shall be secured to any detachable pallet to ensure stability in handling and transport. The top surface of a detachable pallet shall be free from sharp protrusions that might damage the large packaging.

11.5.10 Timber supports used as strengthening devices to increase stacking performance can be used, provided that they are external to the liner of the wooden large packaging.

11.5.11 The bearing surface of wooden large packaging intended for stacking shall be such as to distribute the load in a safe manner.

12 Test requirements

12.1 Design type testing

12.1.1 The design type of each large packaging shall be tested by a test station (see 4.1) in order to establish whether or not it complies with the requirements of this standard. The tests shall be successfully performed on the design type before such a large packaging can be used for the transport of dangerous goods.

12.1.2 The design type of a large packaging is defined by the design, size, material, thickness and manner of construction. The subjection of large packaging to various surface treatments, for example painting and galvanization, is included in the definition of its design type. Large packaging of lesser height than that of the design type, is included in the definition of design type.

12.1.3 Tests shall be repeated on production samples at intervals as stipulated in 7.2. For the periodic inspections on fibreboard large packaging, preparation at ambient conditions may be deemed equivalent to the requirements of 12.2.5.

12.1.4 Tests shall be repeated after each modification that alters the design, material or manner of construction of a large packaging.

12.1.5 The competent authority may permit the selective testing of a large packaging that differs only in minor respects from a tested type, for example:

- a) a slight reduction in external dimensions of the large packaging;
- b) smaller sizes of inner packaging; and
- c) inner packaging of lower net mass.

12.1.6 The competent authority may at any time require proof, by testing in accordance with this standard, that serially-produced large packaging meet the requirements of the design type tests.

12.1.7 Sufficient large packaging per design type (one specimen for each test) shall be subjected to, and shall pass all the required tests carried out in the sequential order listed in table 2 and described in 12.3.1 to 12.3.4. The specimens shall be

- a) marked with a test reference number that shall be entered on the test report (see 12.3.5),
- b) individually weighed to establish the tare or filled mass, and

c) examined for damage that might invalidate tests, in which event the large packaging shall be replaced by another specimen of the same design type.

12.1.8 Notwithstanding the requirements of 12.1.7, with approval by the competent authority, several design type tests may be performed on one specimen, provided that the validity of the test results is not affected.

Table 2 — Design type tests for large packaging in sequential order

1	2
Description of test	Test required
Bottom lift	When large packaging is fitted with means of lifting from the base
Top lift	When large packaging is designed to be lifted from the top
Stacking	When large packaging is designed to be stacked during transport
Drop	All large packaging

12.2 Preparation for testing

12.2.1 Tests shall be carried out on large packaging prepared as for transport including the inner packagings or articles (see SANS 10229-1).

12.2.2 Inner packagings shall be filled to not less than 98 % of their maximum capacity for liquids or 95 % for solids. Large packaging intended to contain inner packagings designed for the containment of liquids and solids shall be tested separately for both liquids and solids.

12.2.3 For testing purposes, the contents of the inner packagings or articles to be transported in the large packaging may be replaced by other material or articles, provided that this would not invalidate the test results. Where other inner packagings or articles are used they shall have the same physical characteristics as the inner packagings or articles to be transported. In order to achieve the desired load mass in a large packaging intended for the transport of solids, it is permissible to use added weights such as bags of sand or lead shot, provided that they are positioned in such a way that the test results are not affected.

12.2.4 When a liquid substitute is used in the drop test for liquids, such a liquid shall have a relative density and viscosity similar to that of the liquid to be transported. It is permissible to use water for the liquid drop test, provided that:

- a) the liquid to be transported has a relative density not exceeding 1,2 and the drop height as indicated in table 3 is applied; or
- b) the liquid to be transported has a relative density exceeding 1,2 and the drop height is calculated on the basis of the relative density of the liquid intended for transport, rounded off to the first decimal point (see table 4).

2.2.5 Fibreboard large packaging shall be conditioned for at least 24 h at a controlled temperature and relative humidity. One of the following three options shall be chosen:

- a) a temperature of $(23 \pm 2) ^\circ\text{C}$ and a relative humidity of $(50 \pm 2) \%$ (preferred); or

b) a temperature of $(20 \pm 2) ^\circ\text{C}$ and a relative humidity of $(65 \pm 2) \%$; or

c) a temperature of $(27 \pm 2) ^\circ\text{C}$ and a relative humidity of $(65 \pm 2) \%$.

NOTE 1 Average values should fall within these limits. Short-term fluctuations and measurement limitations can cause individual measurements to vary by up to 5 % relative humidity without significant impairment of test reproducibility.

NOTE 2 The purpose of these conditions is not to replicate any ambient condition likely to be met during transport but to standardize the tests and enable them to be reproducible by stabilizing the moisture content of the fibreboard.

NOTE 3 It should also be noted that

- a) the large packaging should be relatively dry before being placed in the controlled atmosphere,
- b) the conditioning period of 24 h might be insufficient to stabilize the moisture content of thick fibreboard even if the large packaging is left open so that moisture can be transferred via outer and inner surfaces, and
- c) the moisture content and the temperature of the inner packagings can significantly affect the moisture content of the large packaging.

12.2.6 Plastics large packaging and large packaging that contain plastics inner packagings (other than bags) for solids or articles, shall be conditioned at a temperature of $-18 ^\circ\text{C}$ for at least 24 h. Keep the test liquid in the liquid state, if necessary, by the addition of anti-freeze. The conditioning may be waived in the case of plastics materials that are known to have sufficient ductility and tensile strength at a temperature of approximately $-18 ^\circ\text{C}$.

12.3 Performance testing

12.3.1 Bottom lift test

12.3.1.1 Applicability

The bottom lift test is applicable to all types of large packaging fitted with means of lifting from the base.

12.3.1.2 Apparatus

Fork-lift truck that has fork tines of width 100 mm or 120 mm.

12.3.1.3 Preparation

In addition to the preparations required by 12.2, fill the large packaging to 1,25 times its maximum permissible gross mass and distribute the load evenly.

12.3.1.4 Procedure

12.3.1.4.1 Insert the tines of the fork-lift truck into the fork pockets (if provided) to a depth equal to 75 % of the dimension of the base dimension in the direction of entry.

12.3.1.4.2 If fixed entry positions are not provided, space the tines apart such that the space between them equals three quarters of the base dimension on the side of entry. Insert the tines to a depth equal to 75 % of the base dimension in the direction of entry.

12.3.1.4.3 Raise and lower the large packaging twice. Repeat the test from all possible positions of entry.

12.3.1.5 Acceptance criteria

There shall be no

- a) permanent deformation which renders the large packaging unsafe for transport, nor
- b) loss of contents.

12.3.2 Top lift test

12.3.2.1 Applicability

The top lift test is applicable to all types of large packaging fitted with devices for mechanical lifting from the top.

12.3.2.2 Preparation

In addition to the preparations required by 12.2, fill

- a) a rigid large packaging to twice its permissible gross mass, and
- b) a flexible large packaging to six times its maximum permissible gross mass and distribute the load evenly.

12.3.2.3 Procedure

Lift the large packaging clear off the floor by its top lift devices in the manner for which it is designed. Maintain that position for a period of 5 min.

12.3.2.4 Acceptance criteria

12.3.2.4.1 Metal and rigid large packaging

There shall be no

- a) permanent deformation which renders the large packaging, including the base pallet, if any, unsafe for transport, nor
- b) loss of contents.

12.3.2.4.2 Flexible large packaging

There shall be no

- a) damage to the large packaging or its lifting devices which renders the large packaging unsafe for transport or handling, nor
- b) loss of contents.

12.3.3 Stacking test

12.3.3.1 Applicability

The stacking test is applicable to all types of large packaging designed to be stacked.

12.3.3.2 Preparation

In addition to the preparations required by 12.2, fill the large packaging to its maximum permissible gross mass and distribute the load evenly.

12.3.3.3 Procedure

12.3.3.3.1 Place the large packaging on its base on a level and firm surface.

12.3.3.3.2 Subject the large packaging to a uniformly distributed superimposed test load (see 3.1.23) of 1,8 times the combined maximum permissible gross mass of the number of similar large packaging that can be stacked on top of the large packaging during transport. Apply the superimposed test load by any of the following methods:

- a) on top of the test large packaging, stack one or more large packaging of the same type and filled to the maximum gross mass; or
- b) place a rigid flat plate, or a reproduction of the base of the large packaging, on top of the large packaging and load with weights simulating the superimposed test load; or
- c) place the test large packaging in an appropriate compression test machine.

12.3.3.3.3 Subject the large packaging to the test load for a period of at least

- a) **5 min** for metal large packaging, and
- b) **24 h** for wood, fibreboard, plastics and flexible large packaging.

12.3.3.4 Acceptance criteria

12.3.3.4.1 Large packaging other than flexible large packaging

There shall be no

- a) permanent deformation which renders the large packaging, including the base pallet, if any, unsafe for transport, nor
- b) loss of contents.

12.3.3.4.2 Flexible large packaging

There shall be no

- a) deterioration of the body which renders the large packaging unsafe for transport, nor
- b) loss of contents.

12.3.4 Drop test**12.3.4.1 Applicability**

The drop test is applicable to all types of large packaging.

12.3.4.2 Preparation

In addition to the preparations required by 12.2, fill the large packaging to its maximum permissible gross mass or load in accordance with the design type. Ensure that the density and viscosity of a substitute liquid substance are similar to those of the liquid to be transported (see also 12.2.4).

12.3.4.3 Procedure

12.3.4.3.1 Perform the drop test within 5 min after the large packaging has been removed from the conditioning chamber (see 12.2.5 and 12.2.6).

12.3.4.3.2 Drop the large packaging onto a rigid, non-resilient, smooth, flat and horizontal surface from a height as given in table 3 or table 4, as applicable, in such a manner that the point of impact is that part of the base of the large packaging considered to be the most vulnerable.

12.3.4.3.3 Drop the large packaging intended to contain explosive articles of class 1, self-reactive substances of division 4.1 and organic peroxides of division 5.2 from a height as specified for packing group II.

Table 3 — Drop height for large packaging that contains substances of relative density not exceeding 1,2

1	2	3
Drop height m		
Packing group I	Packing group II	Packing group III
1,8	1,2	0,8

Table 4 — Drop height for large packaging that contains substances of relative density exceeding 1,2

1	2	3
Drop height m		
Packing group I	Packing group II	Packing group III
Relative density x 1,5	Relative density x 1,0	Relative density x 0,67

12.3.4.4 Acceptance criteria

There shall be no

- a) damage to the large packaging, including the base pallet, if any, which renders the large packaging unsafe for handling and transport, nor
- b) leakage of the filling substance from the inner packagings or articles, nor

- c) rupture in large packaging intended for the transport of articles of class 1 that would permit spillage of loose explosive substances or articles from the large packaging, nor
- d) loss of contents even if the closure is no longer sift-proof.

12.3.5 Test report

12.3.5.1 The test station shall draw a test report up after inspection of the design type of large packaging attesting that the design type, including its equipment, meets the test requirements. The test report is the property of the applicant who commissioned the test and he shall make the test report available to the users of the large packaging.

12.3.5.2 A test report shall contain at least the following information:

- a) name and address of the test station;
- b) name and address of applicant (where appropriate);
- c) a unique test report identification;
- d) date of the test report;
- e) manufacturer of the large packaging;
- f) description of the large packaging design type, for example dimensions, materials, closures, and thickness, including the method of manufacture, for example blow moulding. Drawings or photographs (or both) of the large packaging can be included;
- g) maximum capacity/maximum permissible gross mass;
- h) characteristics of test contents, for example types and descriptions of inner packagings or articles used;
- i) test descriptions and results; and
- j) the signature, name and designation of the signatory.

12.3.5.3 The test report shall contain a statement that the large packaging, as prepared for transport, was tested in accordance with the appropriate requirements of this standard and that the use of other packaging methods or components can render the large packaging invalid (see also 7.2.1).

12.3.5.4 A copy of the test report shall be available to the competent authority.

13 Marking and labelling for transport

13.1 Hazard labels

13.1.1 The hazard labels shall be in the form of a square, set at an angle of 45° (diamond shaped), and of dimensions at least 100 mm x 100 mm. A hazard label shall have a line that is of the same colour as the symbol, 5 mm inside the edge and running parallel with it.

13.1.2 A hazard label is divided into halves. The upper half of the label is reserved for the pictorial symbol and the lower half for the text and for the class or division number and the compatibility group, as applicable.

13.1.3 The colours and symbols on hazard labels shall visually match colour reference numbers:

- a) orange – Pantone 151 or NCS S 0570-Y50;

SANS 10229-2:2010

Edition 1.1

- b) red – Pantone 192 or NCS S 0580-Y90R;
- c) green – Pantone 361 or NCS S 1565-G;
- d) blue – Pantone 300 or NCS S 2065-B; and
- e) yellow – Pantone 109 or NCS S 0570-G90Y.

In case of a dispute the NCS colours shall take precedence.

NOTE The NCS colour chart is available from Colour Centre SA, Postnet Suite 50, Private Bag X9, Melville 2109, fax (011) 482-5419 and e-mail ncscolour@iafrica.com.

13.1.4 Hazard labels shall comply with the depictions in table 5 and shall be of size not less than that specified in 13.1.1.

13.1.5 It is the responsibility of the manufacturer of a large packaging to supply a facility on the large packaging for transport information. The supplier, the manufacturer, the distributor or the importer responsible for filling the large packaging shall affix the correct marking and labelling information for transport on the large packaging.

13.2 Transport information

In addition to the markings required by clause 9, each large packaging presented for the transport of dangerous goods shall have the following information legibly and durably marked or displayed on its external surfaces:

- a) the proper shipping name of the substance contained in the inner packagings of the large packaging (see 3.1.19 and B.2 of SANS 10228);
- b) the applicable United Nations' number of the substance contained in the inner packaging of the large packaging (see 3.1.25 and B.2 of SANS 10228);
- c) the applicable hazard label(s) (see table 5);
- d) if the large packaging contains an environmentally hazardous substance (see 13.5.2), it shall display the environmentally hazardous substances pictogram illustrated in figure 1;
- e) if the large packaging contains a marine pollutant (see 13.5.3), it shall display the marine pollutant pictogram illustrated in figure 2; and
- f) the name and address of the packer, agent or consignor.

13.3 Location of marking and labels

A large packaging of capacity more than 450 L shall be marked and labelled on two opposite sides in a location as to be readily visible when the large packaging is stacked. To save space, the right-hand corner of one hazard label may overlap the adjacent corner of a hazard label indicating the subsidiary risk, provided that none of the written information on a hazard label is obscured.

13.4 Durability of marking and labels

Marking and hazard labels applied to a large packaging shall, on contact with the contents of the inner packaging, remain legible and shall be capable of being immersed in water at ambient temperature for 4 h continuously. If, after such immersion and subsequent drying, all the printing is still legible, no significant colour change has taken place and the label remains affixed to the large packaging, the marking and hazard label shall be deemed to have passed the test.

13.5 Additional marking

13.5.1 General

Additional marking that indicates precautions to be taken during transport, handling and storage, may be displayed on the large packaging, for example, an umbrella indicating that the large packaging should be kept dry.

13.5.2 Environmental hazards

13.5.2.1 Large packaging that contains environmentally hazardous substances assigned to UN 3077 and UN 3082 in accordance with the classification criteria of SANS 10228 shall, in addition to the hazard label of class 9, be durably marked with the environmentally hazardous substance pictogram (see figure 1).

13.5.2.2 The environmentally hazardous substance pictogram shall have the symbol and lines in black on a white background. The dimensions of the pictogram shall be at least 100 mm x 100 mm.



Figure 1 — Pictogram for environmentally hazardous substances

13.5.3 Marine pollutants

Large packaging that contains a marine pollutant, identified by “PP” or “P” (see 3.1.12 and B.2 of SANS 10228) shall, in addition to the relevant hazard class or division label, be durably marked with the marine pollutant pictogram as illustrated in figure 2. The marine pollutant pictogram shall be applied adjacent to the hazard label(s), or by itself (see also 13.3).

13.5.3.2 The marine pollutant pictogram shall be in a contrasting colour to that of the large packaging. If the marine pollutant pictogram is affixed as a sticker, the symbol, lettering and lines shall be in black on a white background.

13.5.3.3 A marine pollutant pictogram shall be in the form of a triangle with sides of length at least 100 mm.

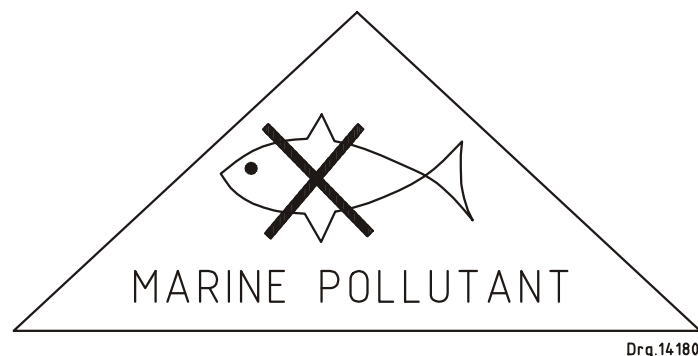


Figure 2 — Marine pollutant pictogram

Table 5 — Hazard labels





1	2
Class, division or subsidiary risk	Hazard label
1.1, 1.2, or 1.3	 <p>(See NOTES 1 and 2)</p>
1.4	 <p>(See NOTE 2)</p>
1.5	 <p>(See NOTE 2)</p>
1.6	 <p>(See NOTE 2)</p>
<p>NOTE 1 Insert the division for explosives (see SANS 10228), in the space marked * *. To be left blank if explosive is the subsidiary risk.</p> <p>NOTE 2 Insert the compatibility group (see SANS 10228), in the space marked *, denoted by a letter A to N (excluding I and M) and S as indicated in SANS 10228. To be left blank if explosive is the subsidiary risk.</p>	

Table 5 (continued)










1	2
Class, division or subsidiary risk	Hazard label
2.1	 
2.2	 
2.3	
3	 
4.1	
4.2	

Table 5 (continued)














1	2
Class, division or subsidiary risk	Hazard label
4.3	 
5.1	
5.2	   <p>(See NOTE 3)</p>
6.1	
6.2	
7	
<p>NOTE 3 The yellow label with the flame over the circle can be used in conjunction with the label with the red upper half and the flame until 1 January 2007, from which time use of the latter label will be obligatory.</p>	

Table 5 (concluded)

1	2
Class, division or subsidiary risk	Hazard label
7	
7	
8	
9	 <p>Drg.492a-x</p>

Bibliography

Standard

SANS 9001/ISO 9001, *Quality management systems – Requirements*.

Other publications

Economic Commission for Europe Inland Transport Committee. *European agreement concerning the international carriage of dangerous goods by road (ADR)*. ECE/TRANS/160. Printed by the UN.

International Air Transport Association (IATA). *Dangerous goods regulations*. Printed by IATA.

International Civil Aviation Organization (ICAO). *Technical instructions for the safe transport of dangerous goods by air*. 2003-2004 Edition. Montreal, Canada. Printed by ICAO.

International Maritime Organization (IMO). *International maritime dangerous goods code (IMDG code)*. 2006 Edition. London, United kingdom. Printed by the IMO.

International Maritime Organization (IMO). *International convention for safe containers*. Printed by the IMO.

United Nations (UN). *Recommendations on the transport of dangerous goods. Model regulations*. Fourteenth revised edition. New York, United States of America and Geneva, Switzerland. Printed by the UN.

United Nations (UN). *Recommendations on the transport of dangerous goods. Manual of tests and criteria*. Fourth revised edition. New York, United States of America and Geneva, Switzerland. Printed by the UN.

SABS – Standards Division

The objective of the SABS Standards Division is to develop, promote and maintain South African National Standards. This objective is incorporated in the Standards Act, 2008 (Act No. 8 of 2008).

Amendments and Revisions

South African National Standards are updated by amendment or revision. Users of South African National Standards should ensure that they possess the latest amendments or editions.

The SABS continuously strives to improve the quality of its products and services and would therefore be grateful if anyone finding an inaccuracy or ambiguity while using this standard would inform the secretary of the technical committee responsible, the identity of which can be found in the foreword.

Tel: +27 (0) 12 428 6666 Fax: +27 (0) 12 428 6928

The SABS offers an individual notification service, which ensures that subscribers automatically receive notification regarding amendments and revisions to South African National Standards.

Tel: +27 (0) 12 428 6883 Fax: +27 (0) 12 428 6928 E-mail: sales@sabs.co.za

Buying Standards

Contact the Sales Office for South African and international standards, which are available in both electronic and hardcopy format.

Tel: +27 (0) 12 428 6883 Fax: +27 (0) 12 428 6928 E-mail: sales@sabs.co.za

South African National Standards are also available online from the SABS website <http://www.sabs.co.za>

Information on Standards

The Standards Information Centre provides a wide range of standards-related information on both national and international standards, and is the official WTO/TBT enquiry point for South Africa. The Centre also offers an individual updating service called INFOPLUS, which ensures that subscribers automatically receive notification regarding amendments to, and revisions of, international standards.

Tel: +27 (0) 12 428 6666 Fax: +27 (0) 12 428 6928 E-mail: info@sabs.co.za

Copyright

The copyright in a South African National Standard or any other publication published by the SABS Standards Division vests in the SABS. Unless exemption has been granted, no extract may be reproduced, stored in a retrieval system or transmitted in any form or by any means without prior written permission from the SABS Standards Division. This does not preclude the free use, in the course of implementing the standard, of necessary details such as symbols, and size, type or grade designations. If these details are to be used for any purpose other than implementation, prior written permission must be obtained.

Details and advice can be obtained from the Senior Manager.

Tel: +27 (0) 12 428 6666 Fax: +27 (0) 12 428 6928 E-mail: info@sabs.co.za